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Teachers' evaluations about elective mathematic applications for 5th and 6th grade curriculum

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Abstract

In Secondary Schools, Mathematics Applications course started to be taught at 5th and 6th grades in 2013-2014 academic year electively. The aim of this study is to analyze the curriculum of Mathematics Applications class in accordance with teachers' viewpoints. In this research, interviewing technique of qualitative research methods is used. A semi-constructed interview form was prepared by the researchers. Interview form was finalized in accordance with expert views. In the research, with purposeful sampling method, interviews were conducted with 20 teachers who work at secondary schools in Pendik, Istanbul. Data collected in the interviews were analyzed via descriptive analysis method. Results achieved in the research: 1- The teachers were not adequately informed about the program, they reached the information about the curriculum on Internet sites. 2- The strength of the program was that it enabled more practice for students; whereas the shortcoming was that there were uncertainties in the implementation of the program. 3- Objectives aimed at the program were not clear and understandable, activities were not appropriate for students, and lack of examination in the evaluation decreased the level of students' motivation towards the class. 4- That there was no course book and no teacher guide book was a big problem. 5- That there were high course dropout levels because grades did not have any place on term papers and the activities were not appropriate for the students' level.

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1.Introduction

Mathematics is one of the leading courses at which students who study at primary and secondary school are unsuccessful (Tıraş, 1999). The reasons why students are not successful at this course are associated with the facts that no relationship can be built between mathematics and everyday life, the

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contents are not related to one another, and the subjects are comprised of disciplines, theories, equations and formulas. In this context, Mathematics is seen as irritating and a class which should be learned by memorizing (Baki, 2006). Today, Subjective information which people acquire via transfer based on their own experiences rather than objective and fixed information come into prominence (Çetin, 2004). The information taught in Mathematics class needs to be comprehended, constructed and put into practice by students so that it can be beneficial. For instance, learning proportion subject does not contribute to the student's everyday life; because people are not asked anything about proportion except for examinations. Apart from that, while planning any day, a person can encounter with such a situation as "last time I spent 7 hours to paint the 85 m2 wall. Today, I need to paint 700 m2 walls. How much time does it take?" (Altun, 1998). When it is taken into consideration that Mathematics has an important place in solving problems we encounter in our lives, (Baykul, 1998) Mathematics activities associated with daily life are of great importance.

Quests for benefitting from Mathematics in daily life have started and attention has been directed to mathematics subjects and teaching period. Increasing efficiency in teaching Mathematics, time spared to teaching Mathematics and how the subjects thought to be hard to learn by some people are taught are discussion issues (Altun, 2002). In order to effectiveness in teaching Mathematics, certain points should be reflected to the activities carried out in the classroom. Since what should be put into the center is not scientific information, but students who attend the process through activities actively (Duru&Korkmaz, 2010). Doyle (1988) thinks that students should be provided with taking responsibilities and duties in the activities carried out so as to have them take part in the class actively (Özmantar, Bozkurt, Demir, Bingölbali&Açıl, 2010).

The aim of Mathematical Applications classes which started to be taught in secondary schools in 2013-2014 school year is; "have them love Mathematics and have a positive attitude towards Mathematics while improving mathematical information and skills by giving opportunities to make mathematical applications appropriate for their level" (MEB, 2013: 1). The way how to teach a lesson is determined in accordance with this aim. Problems which need to be chosen should be associated with daily life and should enable practical applications. They should also be meaningful for students at the same time. Students should produce solutions to the determined problems by making group work, groups should present solution suggestions to the class and via discussion method, the most appropriate solution technique should be chosen all together. Teacher should be a listener and a leader after explaining the problem (MEB, 2013).

Mathematics is one of the courses which implementation takes a great place in daily life, too. Moreover, Mathematics also increases students' thinking and questioning ability. For this reason, teaching mathematics at school and mathematics activities should be given great importance. Since activities support an easy learning of Mathematics and create a positive attitude towards Mathematics. Students who like activities develop a positive attitude towards Mathematics, too. For this reason, conducting researches about the effectiveness of the classes with Mathematics activities and discussing how those classes can be rendered more effectively are important. The aim of the present study is to analyze the curriculum of Mathematics Applications in accordance with teachers' viewpoints.

2. Method

2.1. Participants

In this research, interviewing technique of qualitative research methods is used. A semi-constructed interview form was prepared by the researchers. Interview form was finalized in accordance with expert views. In the interview form, there are five open-ended questions. The teachers were asked questions as to whether informing about Mathematics Applications class curriculum was made or not, how they reached the information about the program, good and bad sides of the program, acquisitions aimed at the implementation of the program, activities and evaluation dimensions, course books and course materials, the problems encountered in the implementation of the program and their own suggestions for solving the

problems. In the research, via purposeful sampling method, 20 teachers who work at secondary schools in Pendik, Istanbul were reached. 12% of teachers who comprise of working group are female. 8% of them are male. The age average of teachers is 25.7 and the seniority average is 3.4. Interviews made with the teachers were recorded by taking permission from them. The audio records were transcribed later. The data gathered was analyzed with the method of descriptive analysis. Descriptive analysis; is comprised of four stages; creating a framework for descriptive analysis, processing the data in the thematic framework, identification of findings and interpreting them (Yıldırım & Şimşek, 2008: 224). For the analysis of the data, a thematic framework was identified by the researchers. Within this scope, the data were firstly coded by each researcher. And then, by comparing the data raked together, common codes were made in common themes with common viewpoints. The teachers who were interviewed are shown in G1, G2, G3 … shape.

3.Findings

The teachers' viewpoints about Mathematics Applications curriculum are shown as tables in the following. When examined the teachers' situation of being informed about the curriculum, all of the 20 teachers interviewed expressed that they were not informed about the curriculum. The studies conducted by the teachers to get informed about the curriculum are presented in Table 1.

Table 1. Teachers' viewpoints about their situation of being informed about the curriculum

Theme (Categories)	Codes	n	%
Studies for getting informed	Getting informed from Internet sites (forums, social networks) *(G1, G4, G5, G6, G7, G8, G11, G12, G13, G15, G16, G19, G20)*	13	65
	Getting informed by communicating with group teacher and teacher friends *(G3, G4, G6, G8, G9, G15, G17, G18)*	8	40
	Examining the curriculum, yearly lesson plan *(G2, G9, G16)*	3	15
	Examining the workbook *(G1, G2, G9, G10, G14, G15)*	6	30

As Table 1 shows that, 65% of the teachers got information from forums and social networks. Other viewpoints are getting informed from group teachers and communicating with other teacher in %40 percentage, getting informed about the curriculum in %30 percentage, examining the curriculum and yearly lesson plan in %15 percentage. The quotations from the teachers' viewpoints are presented below.

"No informing about the curriculum was made. I tried to reach the information about the curriculum on the Internet sites such as "Eğitimhane". I tried to identify my own curriculum by communicating with our teachers who taught Mathematics at the past. (G4)

"No informing was made. I also reached my own information from the Internet. " (G13)

"Informing was not made. I got informed when I examined the curriculum. In fact, I think there is no certainty. I do not think all schools evaluate them in the same way." (G14)

"No informing was made. After approximately 2 months, a workbook was sent by MEB. I taught my lessons in the light of this workbook. (G18)

"Actually there could have been better information. The process went on with my exertion. Since I thought the lesson and applied the activities according to the plan that I found in the internet. I think I could have been informed much more." (G16)

The teachers' opinions about the superior and limited properties of the program are presented in table 2.

Table 2. The Teachers' ideas about the superior and limited properties of the program

Theme/Category	Codes	n	%
Superior Properties	It provides applying group work (G1, G2, G7, G9)	3	15
	It gives chance to solve much more problems (G2, G3, G11, G16, G15)	5	25
	It provides brain storming (G7)	1	5
	It provides solving intelligence problems (G8)	1	5
	It provides playing math games (G15)	1	5

	It makes the students to link the math with the real world (G17, G18)	2	10
Limited Properties	There are some unclear points while applying the program (G3, G4, G18, G19, G5, G20)	6	30
	Lack of equipment makes it harder to apply (G4, G17)	2	10
	It provides less mathematical addition (G12, G13)	2	10

Table 2 shows that teachers think the program provides 25% more problem solving. Other opinions about the opportunities of the program are as follows: it provides 15% group work, 10% linking with the real world, 5% brain storming, solving intelligence problems, playing mathematical games and it increases students' mathematical thinking. The teachers' opinions about the limited properties of the program are 30% unclear parts while applying the program, 10% lack of equipment and it provides less mathematical improvement. The quotations given by teachers are presented below.

"I applied the activities which are included in the book for a week. I solved the mathematic problems and made the students solve them in another week. I sometimes copied the activities in the book and divided them into groups. When they had difficulties I gave them some clues. It is beneficial for them. It is good that there is a program which provides this kind of applying." (G2)

"I think it is beneficial when it is applied according to the aim. But there is not enough electronic equipment. There are some unclear parts about the plan, so some difficulties of making the students interested in mathematical world occur." (G4)

"We are negotiating the problems. We are brain storming. We are trying to create new solutions. It is different that we have group working. It is a good program for students." (G18)

"Although there are some problems because of the unclear sides of the program it is of course beneficial. I think making the students face with the real world problems improve them." (G18)

The opinions of the teachers about acquisitions, activity and evaluation aspects are presented in Table 3.

Table 3. The opinions of the teachers about acquisitions, efficiency and evaluation aspects

Themes (Categories)	**Codes/Teachers**					
	Positive	**n**	**%**	**Negative**	**n**	**%**
Acquisition	Appropriate for students level (G1, G3, G9, G16)	4	20	Not appropriate for students level (G8, G14)	2	10
				It is hard to distinguish the acquisitions between 5th and 6th grade (G4, G10, G11)	3	15
	Clear, understandable (G2, G5, G9, G16, G17)	5	25	Acquisitions are not related to Mathematics (G7, G15, G19)	3	15
				Are not understandable (G11, G20)	2	10
Activity	Appropriate for students level (G3,G13,G16, G17)	4	20	Not in sufficient number of (G1, G8, G9, G15, G19)	5	25
				Not appropriate for students level (G1,G4,G5, G6, G7, G13, G18, G20)	8	40
				No material (G3,G10)	2	10
	Interesting (G12,G14)	2	10	5^{th} and 6^{th} classes are processing together. That causes differences in level(G2,G16)	2	10
Evaluation	Absence of Examination removes the pressure(G3, G4)	2	10	Without Examination, course is not acknowledged (G5, G11, G18)	3	15
				Absence of Examination causes decreasing motivation (G1, G2, G3, G6, G8, G9)	6	30

	Using assessment methods without examination does not create problems. (G7, G15, G16, G17)	4	20	Absence of Examination causes absenteeism (G1, G2, G12, G13, G14)	5	25

As seen in Table 3 teachers' views regarding to acquisitions, efficiency and evaluation aspects are divided into "positive" and "negative" themes. The view of teachers according to acquisitions is the item "clear and understandable" and is represented with 25%. A different view is that acquisitions are gained through "appropriate for student's level" and is represented with the rate of 20%. Teachers' negative views through acquisitions are most valued with 15% and are the items "it is hard to distinguish the acquisitions into 5th and 6th grade" and "acquisitions are not related to Mathematics". Again different negative views rated with 10% are "not appropriate for student's level" and "are not understandable". Negative views towards activities are mostly ranked by 40% with the element "not appropriate for student's level". Different views show the result of 20% that activities are "not in sufficient number", and 10% that "No material" is available and "5th and 6th classes are processing together. That causes differences in level". Teachers' positive view towards the evaluation is mostly rated with 20% to the item "Using assessment methods without examination does not create problems". A different view is that "absence of Examination removes the pressure" and is rated with 10%. Teachers' negative opinion towards evaluation is highly valued with 30% by the item "absence of Examination causes decreasing motivation". Different views are valued with 25% by the item "absence of Examination causes absenteeism" and 15% with the item "without Examination, course is not acknowledged". The quotations given by teachers are presented in the previous part below.

"It is possible to increase the amount of activities. In my opinion, in books there should be activities for each level. Teachers' should have the opportunity to make the activity according to the level of the class. That will help to overcome problems related to compliance with class level." (G1)

"It affects in a negative way that the evaluation is done by examination. Some of the student's interest decrease to almost zero. There are problems caused by absenteeism because we do not have regular attendance." (G2)

"In my opinion, the acquisitions are not appropriate for 5th grade students. For instance, ratio and proportion is taught in 6th grade, but there are two ratio and proportion gaining activities prepared." (G18)

"I think a few of the activities do not fit to 5th grade students. It is possible that there are activities which are not taught yet. As a matter of fact, it would be beneficial to prepare the Textbooks with diligence in later years." And in my opinion the 5th and 6th grade students should not work together." (G16)

"Some of the activities are not appropriate for classroom. The use of computers and excel program would be beneficial. We have not that in our school. For that reason, the application would not succeed." (G11)

Teachers' views towards textbooks and course materials which change during the program are represented in table 4.

Table 4.Teachers' views towards textbooks and course materials which change during the program

Themes (Categories)	**Codes**	**n**	**%**
Strong Sides	Books are not exiting and boring *(G1)*	1	5
	Activities are related to the real world *(G1)*	1	5
Weak Sides	Activities are not appropriate to the level (G2, G16)	2	10
	There is no content in the activity book *(G3, G7)*	2	10
	No guidebook *(G3, G4, G15, G8)*	4	20
	Activity book does not fit to the level *(G5, G6)*	2	10
	Distribution in activity book are disproportionate (G9, G19)	2	10
	There should not only activities in the textbook *(G10)*	1	5
	No textbook (G11, G12, G13, G14, G15)	5	25

Span of activity is to long (G17)	1	5

In the 4th table there are opinions of the teachers regarding to textbooks and course materials which change during the program are shown in two themes; “strong sides” and weak sides”. Teachers’ views about the strong sides are ranked with 5% that “books are not exiting and boring” and “activities are related to the real world”. The weak sides according to the teachers’ view are mostly valued with 25% to the item “no textbook”. The other views are ranked with 20% that there is “no guidebook” ,10% is the score for the items “activities are not appropriate to the level”, “there is no content in the activity book”, “activity book does not fit to the level” and “distribution in activity book are disproportionate”. Eventually, the items “there should not only activities in the textbook” and “span of activity is to long” are valued with 5%. The quotations given by teachers take place below.

“I think, the preparation of the textbook are well arranged. The activities are related to the daily life and it is easy to motivate students because they are exciting.”(G1)

“In general, I do not like the textbook. Because the activities for 5th grade class are created without taking into consideration that they are not taught yet.” (G2)

“We have no textbook, only a book with activities which is on the net.” (G14)

“Some of the activities take 4 hours. In my opinion, the time factor should be considered carefully in the construction phase.” (G17)

The thoughts of the teachers about the difficulties they encounter in applying the program and the ideas for solutions are given in table 5.

Table 5. The opinions of the teachers about the problems they encounter in applying the program and the suggestions for solutions.

Theme(Categories)	**Codes**	**n**	**%**
Problems	Late check in of the course grades to school report causes absence (G1, G12, G13, G14, G17)	5	25
	No check in of the course grades to the school report reduces attention (G1, G8, G9, G18)	4	20
	Course not arranged for the level of students (G1)		
	The level of activities is not convenient for the students (G2, G6, G7, G16, G18)	5	25
	It is hard to understand the activities. (G5)	1	5
	There are uncertainties in the program (G4, G11, G20)	3	15
	It is overshadowed by the mandatory Mathematics (G3)	1	5
	Due to the crowded class size, it is not efficient (G15)	1	5
	There is difficulty in finding material and copying (G10, G11)	2	10
	Activities are not interesting (G6)	1	5
	Allocated time for the activities is not enough (G13, G14)	2	10
	Distribution of the activities to the subjects is not right (G19)	1	5
	Due to the differences between the level of students classroom management is difficult (G6)	1	5
	Students do not have awareness of the course (G14)	1	5
Solution Suggestions	Course should effect the school report (G1, G6, G8, G9, G12)	5	25
	Students should be grouped according to class level (G1, G16, G18)	3	15
	Level of activities should be scrutinized (G2, G7, G16)	3	15
	Activities should be diversified (G11, G14, G17, G19, G20)	5	25
	Elective course should be included in mandatory mathematics (G3)	1	5
	There should be a guidebook for the teachers and teachers should take in-service training (G4, G16, G20)	3	15
	Physical conditions of the schools should be regarded (G5)	1	5
	There should be teachers who have expertise on the activities (G5)	1	5
	Materials should be improved (G10, G17)	2	10
	Activities should be correlated with the subjects of mandatory Mathematics (G6, G7)	2	10
	Elective courses should be abolished (G12, G13)	2	10
	Books sent to schools should be in different levels (G13, G14, G20)		
	Problem solving should be concentrated on (G15)	3	15

1 5

In the 5th table opinions of the teachers are indicated in two themes; problems and solution suggestions. In the opinions of the teachers about the application of the program, "late check in of the course grades to school report causes absence" and "the level of activities is not convenient for the students" are the highest rated problems with 25% ratios. Other opinions are, respectively; "no check in of the course grades to the school report reduces attention" with 20%, "uncertainties in the program " with 15%, "difficulty in finding material and copying" and "allocated time for the activities is not enough" with 10%, hardship in understanding the activities, being overshadowed by the mandatory Mathematics, crowded classroom size, no striking activities, distribution of the activities to the subjects, classroom management and awareness of course with 5% ratios. Teachers' solutions for problems that there faced with is scored with the rate of 25% by the item "the level of activities is not convenient for the students" and "Activities should be diversified". Different suggestion are in sequence, with 15% the item "there should be a guidebook for the teachers and teachers should take in-service training", "students should be grouped according to class level" and "level of activities should be scrutinized". The items "materials should be improved", "elective courses should be abolished" and "activities should be correlated with the subjects of mandatory Mathematics" are valued with 10% and with rate of 5% the items "elective course should be included in mandatory mathematics", "physical conditions of the schools should be regarded" and "problem solving should be concentrated on" are ranked with rate of 5%. The quotations given by teachers take place in the previous part below

"It would make sense, if the number of the weekly mathematics lessons in the curriculum were taken into compulsory lessons and also the content of the activities. At least, students would gain the logic that the application is given in mathematics lesson, not under a different lesson. Also that they are equal (some of them choose, some not) and in a regular schedule." (G3)

"One of the biggest problems is the low interests; because the course is elective. Students attend the course for marks, not for learning. Students with this mentality do not care about the lesson." (G8)

"I would change some of the main lines, which are; the teachers' who give lessons should attend an in-service training course. Because the background knowledge is weak. Guide books should be sent to the schools. I would separate 5th and 6th grade. After that, I would adjust the conformity of the activities with the level of proficiency." (G16)

"It is possible to distribute the themes according to activity issues." (G19)

"The classes are crowded so the activities are not much valuable. For that reason I limit the activities" (G15).

4. Discussion

The results which are obtained in the research about selective application of mathematics curriculum and the views of the teachers could be summarized as following: 1- The teachers were not informed about the program, they reached the information about the curriculum on Internet sites mostly. 2- The good side of the program is that it enabled the solution of more questions; whereas the bad side of it is that there are uncertainties in the implementation of the program. 3- Acquisitions aimed at the program are not clear and understandable, activities are not appropriate for students, that the examination does not exist in the evaluation decreases the level of students' motivation towards the class. 4- That there is no course book and no teacher guide book is a big shortcoming. The activities in the workbook are not appropriate for the students' level. 5- That there are absences because grades do not have any place on term papers and the activities are not appropriate for the students' level and these are the leading problems experienced. That grade affects term papers and that activities should be varied are these are the leading suggestions for solutions of the problems.

According to the results of the research, it is easy to say that there are uncertainties in the procedure of selective mathematics application, particularly in the process of supplying the program application. This

situation leads to dissimilarities in practice. The reasons of these differences are defective information about methods in acquisition, activities and evaluation classes and the missing guidebooks which are not sent. The Investigations of Bozkurt (2012) related to mathematical activities in primary and secondary class shows the necessity to inform teachers about the concept of mathematical activities, otherwise the expected outcome cannot be seen. In order to overcome this obstacle, it is essential to create an environment in which the teacher is able to grasp the importance of the activities, also the opportunity to improve the effectiveness of their professional development to create such activities.

Another result obtained in the study is the negative effect caused by not distributing the textbooks which affect teachers as well as students. Students, who are unable to catch the importance of this course and incompetent to create the sufficient awareness, do not continue the class. This leads to absenteeism. Schools with economic problems have not the chance to print out the copy of the activity book from the Internet. As a result, the activities are limited for the teachers who are able to write it on the whiteboard. Moreover, teachers lecture the compulsory mathematics course with editing covered topics so far, solving logic and intelligence questions and sometimes playing mathematic games.

Işık (2008) mentioned the importance of teachers' decision in terms of choosing the textbooks which should be taken into consideration, when the textbooks will be deploy to the schools. Because these factors influence primary second stage mathematics teacher in usage of course book, the frequency and level of the course book. An investigation occurs in order to determine expectation of the course book and it is appropriate that the ministry delivers the course books for free, whereas the negative effect is that the books are changing every year. As consequence teachers' are unable to become familiar with it, so that they cannot use it in full extent.

The predicted aims for acquisitions are clear and understandable; on the other hand, it is obtained that the activities are inappropriate for the level of students. Demirtaş, Arslan, Eskicumalı ve Kargı (2014) found that elective curriculum related to applications of mathematics teachers stated that gains are definite and precise. Karakuş and Yeşilpınar (2013) investigated the process of assessment and teachers' procedure of application and evaluation according to activities which are applied in elementary sixth grade mathematics level class. For this reason, the obstacles are structure content, level and physical features caused by students and educational settings.

There are no written examinations in the elective course. Besides, the notes are not represented in school report. As a consequence according to the study, a lack in students' motivation or problems in attendance of the course occurs. There should be alternative assessment methods to avoid such situations. This could be only achieved with in-service training. To illustrate the necessity of in-service training of alternative assessment methods, Arıbaş and Göktaş (2004) found out that the secondary mathematics class teachers' have not enough background knowledge about the need of alternative in-service training. Furthermore, a study of Baki and Girgin, (2004) related to individual development file whether monitoring and evaluation of students' performance is an effective technique shows that increasing importance of introducing teachers' in the field of pre and in-service training in order to use it as a tool of assessment and a technique for students' individual development.

According to the current research, to represent the course grade in the report, some essential steps should be taken. First of all, enough information about the program must be implied. Measures should to be taken to avoid uncertainties during the application. The activities which are in the program should be revised and adjust to students level and the material and sources related to the course should be sent by the involved department.

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